**Study Guide-KEY**

**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**WHATS A MATTA U**

**TEST I**

***You must include each of the vocabulary terms in your answers to the 3 questions below. You may use a term more than once, but you are only required to use each vocabulary term one time!*** *atoms, matter, element, mass, volume, solid, liquid, gas, vibrate.*

*When writing your essays, please do the following!*

*\_\_\_\_ Begin with a capital letter, end with a period!*

*\_\_\_\_ Write in complete sentences!*

*\_\_\_\_ PLEASE UNDERLINE THE REQUIRED TERMS USED IN YOUR ANSWERS!*

1. **Matter can be classified into different states or phases. Give two different examples of matter each in a different phase. Now explain why your examples are matter.**

**Matter is anything that has mass and takes up space and can be classified into 4 different states. These states are solids, liquids, gases and plasmas. Two examples of solids are ice cubes and desks. These are solids because they have a definite shape and volume. Their particles are packed more tightly and they move by vibrating.**

 **Two examples of liquids are water and lemonade. These are liquids because they have definite volume but not a definite shape. They will take the shape of the container. The particles have a little more freedom to move.**

**Two examples of a gas are oxygen and air. These are gases because they have no definite shape or volume. This is because the particles are farthest apart and have the most freedom to move.**

**Two examples of a plasma are stars and lightning. The particles in a plasma have the most freedom to move like in a gas but they are at extremely high temperatures.**

1. **Compare and contrast an element and an atom.**

**Atoms and elements are similar in that neither of them can be broken down. They both have subatomic particles or protons, neutrons and electrons. Atoms make up elements and are the building blocks of all matter.**

1. **Ice, water, water vapor are all different states of matter yet each has exactly the same chemical makeup. Please explain the differences between a solid, liquid, and gas on the molecular level.**

**The difference between a solid, liquid and gas particles is their distance apart and the freedom they have to move. In a solid, the molecules vibrate past each other because they don’t have as much freedom to move and are packed tightly together. Since a liquid has no definite shape, the molecules are further apart and have more freedom to move and can therefore move faster. In addition, a gas has no definite shape or volume giving the molecules the most freedom to move. These molecules get excited and can move the fastest.**

1. **Know & Understand Heat Energy**: Answer the following questions.
2. What is heat? In what direction does energy transfer as heat? \_\_**Heat is moving energy\_\_\_-heat travels from hot to cold or warm to cool \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
3. What is density? \_**Density is the amount of matter in a given space or how tightly packed the molecules of matter are. \_\_\_\_\_\_\_\_\_\_\_\_\_\_**
4. What is equilibrium and what does it have to do with heat? \_\_\_**Equilibrium is balance and sameness. Heat will travel until the temperature is the same in matter known as thermal equilibrium.** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What are the three ways that energy moves as heat? \_\_**Conduction, convection and radiation** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. If you put an ice cube in the refrigerator, it will melt. In which direction is heat moving?

 \_\_\_**the heat is moving from warm to cold so it will move from the refrigerator to the ice cube . \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. If you touch a cold metal flagpole, in which direction will heat move? \_\_\_\_\_\_\_\_\_\_**from your hand to the flagpole- warm to cold.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. What is convection? Explain it in a pot of boiling water.

 *\_\_***Convection is the movement of heat within a substance like a gas or liquid. The water that is near the flame heats up and becomes less dense and then rises, pushing the cooler more dense air down which creates a convection current.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

**Know the following vocabulary.**

 **C Vocabulary B Vocabulary A Vocabulary**

Matter- anything that takes up space and has mass

Nucleus- center of an atom made up of protons and neutrons

Protons- positively charged subatomic particles in the nucleus of an atom

 Atoms - smallest particle from which all elements are made

 Weight- pull of gravity on an object’s mass

 Neutrons- subatomic particles found in the nucleus of an atom with no charge

Element- a pure substance that cannot be broken down

Molecules- a particle composed of 2 or more atoms

 Electrons- negatively charged subatomic particles that orbit the nucleus of an atom

 Mass- amount of matter or stuff in something

 Compounds- a substance made of 2 or more elements chemically combined

 Volume- amount of space occupied by an object

 Plasma- a gas that has been heated to very high temps

 Solid- molecules vibrate - definite shape and volume

 Physical Properties- something that can be broken down physically- ripping, crushing, bending, melting, phase or state changes

 Liquid - takes the shape of the container- more freedom to move- no definite shape, definite volume

 Chemical properties- something that can only be broken down chemically- burning, flammability, rotting

 Gas- no definite shape or volume- particles have most freedom to move

 Vibrate- bumping past each other